VIII. *A Letter from Mr.* James Simon, *of* Dublin, *to* Martin Folkes, *Eſq*; *Pr. R. S.* *concerning the* Petrifactions *of* Lough-Neagh *in* Ireland: *To which is annexed a Letter from the Right Rev. Dr.* George Berkeley *Lord Biſhop of* Cloyne *to* Tho. Prior, *Eſq*;.

SIR,

Read Feb. 9. 1746-7. IN my laſt I mention'd ſome Petrifications I had ſent in a Box to *Solomon Dayrolles*, Eſq; *F.R.S.* to be deliver'd to you, and preſented to the *Society*: I mention'd, at the ſame time, that I had made ſome few Remarks and Obſervations on theſe kind of Petrifications, commonly called *Lough-neagh* Stones; I hinted, that, if the bad State of my Health would permit me, I would ſend you theſe Remarks, which, tho' my great Heavineſs and Dizzineſs continue, I have drawn up, during ſome favourable Intervals; and beg Leave to lay them before you, that you, and ſome of your Friends, may examine them ſtrictly, and be kind enough to redreſs the Miſtakes, however numerous. I ſearch for the Truth, am willing to improve, and will moſt thankfully receive Advice. To proceed:

Moſt of the antient Writers, that have treated of *Ireland*, have made mention of the peculiar Qualities of *Lough-neagh* of turning Wood into Stone; ſome

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of them (*a*) have gone ſo far as to ſay, that it would turn that Part of the Wood which was in the Mud into Iron; the Part in the Water into Stone, whilſt the Part above Water remained Wood.

Some later Writers, particularly Meſſieurs *William Molyneux*, *Francis Nevill*, and *Edward Smyth*, and from them the late learned Dr. *Woodward*, (*b*) the Author of the Notes on *Varenius*'s Geography, and others (*c*), ſeem rather to think, that this petrifying Quality doth not lie ſo much in the Lake itſelf, as in the Ground near or about it.

Mr. *Edw. Smyth* (*d*), who inlarges the moſt on this Subject, and ſeems to have led the others, and drawn them into his Opinion, tells you, "That "no Experiment or Obſervation yet made, that "he could hear of, could prove that this Lough has "really the Quality of petrifying Wood, or that the "Water doth any way help or promote the Petri"fication." He there gives you an Example of a Gentleman of Worth and Credit, "who had fixed "two Stakes of Holly in two different Places of "the Lough, near that Place where the *Upper Bann* "enters into it, and that the Parts of the Stakes "which

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(*a*) *Boetius* Hiſt. Gem. et Lap.

(*b*) Catal. of *Engliſh* Foſſils, Part II. p. 19.

(*c*) Sir *James Ware*'s Antiq. by *Walt. Harris*, p. 227. Edit. 1745, folio.

(*d*) Afterwards Biſhop of *Down*. *See* Phil. Tranſ. N°. 174.

“ which had been waſhed by the Water for about
“ 19 Years, yet remained there without any Altera-
“ tion, or the leaſt Advance to Petrification.’

Another Reaſon for his doubting of this Quality is, “ That tho’ it is reported that the Water hath
“ this Virtue, eſpecially where the *Black-Water* diſ-
“ charges itſelf into the Lake, yet that, as it ſeems
“ evident, from the Nature of liquid Bodies, that
“ any Virtue received in one Part muſt neceſſarily
“ be diffuſed thro’ the Whole, at leaſt in ſome de-
“ gree; therefore (ſaith he) there is good Reaſon
“ to believe, that the Water is wholly deſtitute of
“ this petrifying Quality :” But a few Lines lower he tells you (*a*), “ That he had ſufficient Ground to
“ conjecture, that other Wood as well as Holly had
“ been petrify’d about this Lough; becauſe ſome
“ Fiſhermen, being Tenants to a Gentleman from
“ whom he had this Relation, told him, that they
“ had found buried, in the *Mud* of this *Lough*,
“ great Trees, with all their Branches and Roots
“ petrify’d; and ſome of that Bigneſs, that they be-
“ lieved they could ſcarcely be drawn by a Team of
“ Oxen; that they had broke off ſeveral Branches
“ as big as a Man’s Leg, and many bigger, but could
“ not move the great Trunk.”

I ſuppoſe Mr. *Smyth* (or the Gentleman his Friend) ſaw theſe Branches, and was thereby convinced of their

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(*a*) *Ibid. ut ſupra.*

their real Petrification, as he was by the Bulk of thoſe Trees of their being Oak, and not Holly; "be-" cauſe, ſays he, no other Tree in that Country, "theſe excepted, grows to that prodigious Bigneſs; "at leaſt it is certain, that Holly never grows to "that Bigneſs."

But how Mr. *Smyth* came to be convinced, that that theſe Trees were Oak, and not Holly, and yet was not convinced of the petrific Quality in ſome Parts of the Lough, tho' theſe Trees were found petrified in its Mud, is amazing to me: For, if a Team of Oxen could ſcarcely draw them from thence, it was as hard, in my Opinion, to draw them from any adjacent Ground (where they muſt have grown, lain, and be petrified) into the Mud of the Lake, where they were afterwards found: For it muſt be ſuppoſed, that either theſe Trees grew on the Banks of the Lake, and, thro' Age, or any other Accident, fell into the Water or Mud, and were there petrified; or that, with great Labour and Expence, they were brought into it from ſome adjacent Ground, after their actual Petrification, which is hardly to be ſuppoſed.

Mr. *Smyth* (*a*) tells you farther, that "Two Gentle-" men of the North (of *Ireland* where this Lough lies) "had told him, that they had ſeen the ſame Body, "partly Wood, and partly Stone; but the only Rea-" ſon for thinking ſo, being the Diverſity of Co-" lours, which might well enough proceed from ſe-" veral Degrees of Petrification, we may properly "think

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(*a*) *Ibid. ut ſupra.*

" think them deceived; for they made no Experiment " on that Part which they reputed Wood. The Bark " is never found petrified, as I am informed by a " diligent Inquirer; but often ſomething rotten about " the Stone, anſwerable to the Bark."

Mr. *Smyth* I think contradicts himſelf no leſs in his laſt Suppoſition than he did in the firſt. His Friends aſſured him, that they had ſeen one or more of the *Lough-neagh* Stones partly Wood and partly Stone; but they were deceived, he ſays: The Diverſity of Colours, by which they judged one Part of the Stone by its Colour to be Wood, and the other Part likewiſe, by its Colour different from the other, to be Stone, were no more than different Degrees of Petrification. What are we to underſtand by theſe different Degrees of Petrification? by this ſomething rotten about the Stone often found? if not, that ſome Part of the Wood was actually turned into Stone, ſome other Part in a Degree leſs petrified, and ſome other Part not petrified at all, as theſe Gentlemen aſſured him: The Diverſity of Colours, Seeing and Feeling, was enough to convince them, and to determine the Point.

As to his Aſſertion, That, becauſe the Water of this Lake has not every-where, and in every Place, that petreſcent Virtue, it muſt therefore be a good Reaſon to doubt of its having that peculiar Quality in ſome particular Places, I think it may be denied for theſe Reaſons; 1*ſt*. Becauſe a Spring, tho' ever ſo much impregnated with petrific, mineral, or metalline Particles, iſſuing out in ſome particular Place of the Lake, can no more communicate its petrifying Virtue to the Waters of the whole Lake, than the

River *Thames* its Sweetneſs to the Sea, and make all its Water freſh.

Secondly, Becauſe that if this lapideſcent Quality was equally diffuſed thro' the Water of the whole Lake in a Degree ſufficient to turn a whole Tree, or any of its larger Branches into Stone, in all Parts of the Lake without Exception, that petreſcent Virtue muſt act equally on all the Plants or Vegetables whatſoever that grow in the Lake, and upon all other Bodies, Gravel, Sand, Mud, and Clay, that are in, or are daily brought into it; and, at laſt, by a general Aggregation, Agglutination, and Attraction of theſe different Bodies together, the whole Bottom of the Lake, nay the whole Lake itſelf, by the different Degrees of Coalition of Particles, muſt become a ſolid Body; unleſs you would ſuppoſe, that this petrific Quality has no Power on any other Matter but Wood, which is contrary to Experience, Ruſhes, or other Plants, having been found petrified on the Shores of this Lake, as alſo Shells, Clay, and Sand petrified in different Shapes, of all which I have Specimens.

" The Earth, ſays the great *Robert Boyle* (*a*) har-" bours different Kinds of petreſcent Liquors, and " many of them impregnated with one ſort of Mine-" ral or other." There are no Springs, no Waters, but are more or leſs impregnated with ſuch mineral and ſaline Particles; which appears from the moſt limpid; which, after Evaporation, ſtill in the *Reſiduum*,

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(*a*) *R. Boyle*, of the Origin and Virtues of Gems.

ſiduum gives ſome Particles of Salt together with ſome ſtony and mineral ones.

I have found by Experience, that petrifying Springs are generally impregnated, ſome with calcarious and Particles of other Stones, and others with ferrugineous and vitriolic Particles. Thoſe of the ſtony or calcarious Kind, I have obſerved, when they drop on Wood, or other Vegetables, act on them for the moſt part by Incruſtation, having different Degrees and Periods for their reſpective Incruſtations and Coalitions, which yet ſtick cloſe to one another: They ſeldom turn the Wood into Stone; but, ſticking to the Wood, Plants, *&c.* coagulate on it, and by degrees cover it with a Cruſt of a whitiſh Subſtance of different Thickneſs, whereby the Wood is immerged or wrapped in a ſtony Coat, which, if it be broken before the Wood be rotten, you will find it in the Heart of the Stone or Incruſtation, as is ſeen in thoſe Petrifications at *Maudlin Meadows* in *Glouceſterſhire*, at *Hermitage* near *Dublin*, and many other Places: Or, if the Wood be rotten, you will find a Cavity in the Stone, which very often is filled by a ſubſequent Incruſtation or Petrification; the ſtony Particles then taking the Place of the rotten Wood.

Sometimes indeed, theſe Waters, permeating the Pores of the Wood either longitudinally or tranſverſely, inſinuate themſelves therein, fill them up with their ſtony Particles, ſwell, and, by their burning or corroding Quality proceeding from the Lime-Stone, deſtroy the Wood, and aſſume the Shape of the Plant, the Place whereof they have taken.

Theſe kind of Petrifications generally ferment with Acids and Spirit of Vitriol, and, by Calcination, may be reduced to Lime.

Ferrugineous or metallic petrifying Waters moſtly act by inſinuating their fineſt Particles thro' the Pores and Veſſels of the Wood, or other Vegetables, without increaſing their Bulk, or altering their Texture, tho' they greatly increaſe their ſpecific Gravity: And ſuch is the petrified Wood found in or on the Shores of *Lough-Neagh*; for it doth not ſhew any outward Addition or Coalition of forcing Matter ſticking to or covering it (except in ſome Places, where a thin ſlimy Subſtance, taken notice of hereafter, is ſometimes obſerved), but preſerve the Grain and *Veſtigia* of Wood; all the Alteration is in the Weight and Cloſeneſs, by the mineral Particles pervading and filling the Pores of the Wood: Theſe Stones, or rather Wood-Stones, do not make the leaſt Effervescence with Spirit or Oil of Vitriol, nor *Aqua-fortis*; which ſhews, that they are impregnated with metalline Particles, or ſtony ones, different from the calcarious Kind; and may be the Reaſon why the petrified Wood, mentioned by *N. Grew* (*a*), made no Ebullition, at which it ſeems he was ſurpriſed (*b*). Theſe Stones I could not reduce into Lime by the moſt intenſe Fire, nor,

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(*a*) Reg. Soc. Muſ. p. 270.

(*b*) This contradicts an Obſervation of Mr. *John Beaumont* (*Phil. Tranſ.* N°. 129. p. 731.), That moſtly mineral Stones will ſtir with Acids; whereas all thoſe that I have tried, whether *Engliſh* or *Iriſh*, did not at all ſtir with Acids.

nor, with proper Ingredients, procure a Vitrification or Fuſion (*a*).

Altho' Mines have not perhaps been diſcovered near the *Lough*, I have Reaſon to believe that there are ſuch in its Neighbourhood, from the great Quantity of Iron-Stones found on its Shores, and Places adjacent to it, and from the yellowiſh Ochre and Clay to be met with in many Places near it. Of theſe Iron-Stones, which are very ponderous, outwardly of an ocheriſh-yellow Colour, and inwardly of a reddiſh brown, I have calcined many, and do find the Powder of all to yield ſtrongly to the Magnet.

Gerald Boate (*b*) mentions an Iron Mine, in the County of *Tirone*, not far from the *Lough*, and ſuch others at the Foot of *Slew-Gallen* Mountains.

That Mines are generated and found in the Bowels of Hills and Mountains, is obvious to any that have the leaſt Knowlege of Metallurgy; and that Springs alſo proceed from Mountains, is no leſs obvious; therefore ſhould a Spring happen in the Bowels of any of theſe Mountains to run thro' a Vein of Mineral of any kind ſoever, it will waſh and dilute ſome Parts of ſuch Mineral, impregnate itſelf with the unctuous, ſaline, and metallic Particles of ſuch Mines, and convey them along with its Water; and if in its Way, whether under-ground, or at its iſſuing out

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(*a*) Stones of the calcarious Kind turn to Lime by Calcination, and ferment with Acids; but other Kinds, ſuch as Slate, Fire-Stone, Free-Stone, Rag, Grill, *&c.* will do neither, as Experience has hitherto teſtified.

(*b*) *Nat. Hiſt.* of *Ireland*, *Dub.* 1726.

out of the Cliffs of a Mountain, of the Sides of a River, or of the Lake in Queſtion; or whether it riſes under Water, in the middle of ſuch a River or Lake in any particular Place, and in its Courſe meets with Wood, Vegetables, or any other lax Bodies (lodged in the Mud or Gravel), whoſe Pores, by the natural Heat of the mineral Steams, or any other Accident, being open and duly prepared, theſe metallic *Moleculæ* and ſaline Particles will penetrate thro', inſinuate and lodge themſelves in the Pores and Veſſels of ſuch Wood, *&c.* fill them up, and, by degrees, turn them into Stone; (*a*) " There " being ſome of theſe *Juices lapideſcent* of ſo fine a " Subſtance, yet of ſo petrifying a Virtue, that they " will penetrate and petrify Bodies of very different " Kinds, and yet ſcarce, if at all, viſibly increaſe " their Bulk, or change their Shape and Colour."

That ſuch Springs there are, hidden under the Water or Mud of this Lake, I hope will appear probable, from what has been ſaid, and perhaps evident, from the Account I have ſince received, that, in the great Froſt of 1740, the Lake was frozen over ſo as to bear Men on Horſeback, yet ſeveral circular Spaces continued unfrozen. But how the ſeveral Attempts, made, as mentioned, by Meſſieurs *Molineux*, *Nevil*, and *Smyth*, to procure Wood half-petrified (by fixing Stakes of Holly in the Lake, which received no Alteration) proved unſucceſsful, the Reaſon I think is plain, becauſe they were not fixed in the proper Place, *viz.* the Courſe or Vein of the

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(*a*) *Rob. Boyle*, of Gems, p. 124. 8*vo*.

the Spring, where nothing but Chance could have directed them. This petrified Wood is often found in different Places on the Shores of the *Lough*, but generally in greater Plenty when the Water has been diſturbed by great Storms; which makes it impoſſible to fix on the particular Place where the petrifying Juice moſt prevails; except a Tree, or any large Piece, ſhould be found ſo fixed as to reſiſt the Force of the Waves.

Mr. *Smyth* (*a*) makes this further Obſervation: "This Virtue is certainly, if *not only*, in the Ground "or Soil, he judges (ſays he) for theſe Reaſons; "That there are many Stones turned up daily, eſpe-"cially at their breaking up new Ground, which "we cannot in any Probability think were brought "thither; they are often found at two Miles Di-"ſtance from the *Lough*, ſeldom farther, in great "Numbers, and very deep in the Ground; and a "Gentleman (on whoſe Credit I received the In-"formation) ſaw a Stump of a Tree digg'd out of "the Ground at a ſmall Diſtance from the *Lough*, "which, by handling of it, he found to be petrified. "He aſſured me, the Roots and all were Stone, and "altogether like thoſe Stones that are ordinarily "found, and go by the Name of *Lough-Neagh* "Stones. This Gentleman was of Opinion, theſe "were *Lapides ſui generis*, till this Obſervation "convinced him: And that theſe Stones were once "Wood, is, I think, very certain; for they ſhew the "plain *Veſtigia* of Wood; they likewiſe burn, and "cleave:

(*a*) Philoſ. Tranſ. *ibid. ut ſupra.*

“ cleave: Filings of this Stone thrown into the Fire
“ emit a fragrant Smell; and they cut kindly with
“ a Knife, tho' not ſo eaſily as other Wood (*a*)

That this petrific Quality is in ſome peculiar Parts of the Lake, I have endeavour'd to prove; that it is or may be in ſome peculiar Places of the adjacent Ground, I grant; tho', as yet, I could not procure any of thoſe Stones found in the Ground, with Wood continuous. Such as I have, or have ſeen, are of the white Whetſtone-kind, and ſeem to be Holly or Aſh, petrified by ſome ſtrong nitrous and ſtony Particles; for, in a Solution of it in *Aqua fortis* and Oil of Vitriol, it leaves no Tincture, but the Liquor growing muddy, like Pipe-Water after great Rains, therefore ſhews, that they are not ſo ſtrongly impregnated with metalline Particles, as thoſe Stones found in or on the Shores of the Lake.

I need not add any more, to ſhew how mineral Springs may petrify Wood, or any other Vegetables under-ground; but as to whole Trees found petrified and buried within a ſmall Diſtance from the Lake, I ſhould think that the *Lough* might have been formerly broader than it is at preſent, or perhaps hath loſt on one Side what it has gain'd on the other; by which means, what is now dry Ground was formerly under Water, and the other Side *vice verſa:* If ſo, ſuch Trees as are found under-ground might have been petrified in that Part which was overflow'd, and is now dry Land.

Mineral

(*a*) An Anſwer to this, ſee in the Deſcription of the City of *Down*, *p.* 162. The Argument is confuted by the deſired Proof.

Mineral Steams or Exhalations, being highly ſaturated with ſtony and mineral Particles, are often found to have a petrifying Virtue, as is ſeen at the Bath called *Green Pillars* (*a*) in the City of *Buda* in *Hungary*. If ſuch Steams ſhould, in certain Places, find or force their Way thro' the Sand or Pores of the Earth, they may operate on Wood, *&c.* buried in the Ground, permeate its Veſſels, and, by degrees, turn it into Stone; and ſuch, I apprehend, is the moſt probable, if not the only Reaſon, that can be aſſigned for thoſe Petrifications of Wood found in Sand, as mentioned by *Boyle* and *Plot*.

It may be obſerved, that the finer the lapidific Particles are, the more beautiful and natural the Petrification will appear; ſuch is a petrified Root of the Flag or *Iris ſylveſtris* in my Poſſeſſion, which is ſolid Stone at the Bottom, the Pith being turned into a white or ſparry Subſtance, and the growing Knots of the Root, tho' petrified, preſerving their Skin brown, and ſomewhat flexible. This *Phænomenon* indeed has been lately ſolved in the Deſcription of the County of *Down*, *p.* 162. The *Luſus Naturæ*, or Sportings of Nature, is a general Solution, too often brought in, and comes in very *à propos* to anſwer Queries concerning Petrifications, ſuch as Wood, Shells, Worms, *&c.* If the Shells, or other like petrified Bodies (found in Marble or Lime-Stone) which preſerve the moſt exact Reſemblance of the Fiſh or Body they repreſent, were not formerly a real Fiſh, Shell, Worm, *&c.* how comes it

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(*a*) *Philoſ. Tranſ.* N°. 59. p. 1049.

it that ſuch Shells and other Bodies are found unpetrified in Marble, Lime-Stone, Rock, Marl, or any other Stone? The Right Reverend Dr. *Robert Clayton*, Biſhop of *Clogher*, hath ſhewn me in his Collection a Piece of *Italian* Marble, where petrified Shells are ſeen, and others no way petrified, but that may be crumbled to Duſt with the Fingers. I have a Stone (which I found lately in the River *Liffy* at *Chapel-Izod*) of the *Lapis vermicularis* Kind, the Surface whereof, on one Side, is cover'd with a Number of ſmall petrified Worms or Plants; Part of which, ſticking and continuous to the ſtony ones, are ſtill ſoft and flexible.

To return to the *Lough-Neagh* Petrifications; I received laſt Summer, 1745. from my worthy and ingenious Friend the Reverend Mr. *Richard Barton*, about 30 of theſe Stones, found on the Shores of the Lake, ſome in the Water, ſome in the Mud, ſome in the Sand, and others in a yellowiſh Clay. That they were petrified in the Lake is probable, but whether in the Water, Mud, Sand, or Clay, is no matter; for certain it is (to uſe Mr. *Smyth*'s own Words), that they were not brought hither from any Diſtance, ſuch as 2, 4, 6, 8 Miles, after being dug out of the Ground, and then thrown and diſperſed on the Shores of the Lake: And beſides, the Difference in the Colour of theſe Stones, thoſe found in the Lake, and thoſe found in the Ground ſomewhat diſtant from it, is ſuch that they cannot well be miſtaken one for the other. Thoſe found in the Ground are white, and of a looſer Texture; thoſe found in or on the Shores of the Lake are black, cloſer, and heavier. That theſe laſt were petrified by a mineral Spring, appears from the few following Obſervations. —— They do not ferment with Acids, Spirit and Oil of Vitriol. The Solution of this Stone in *Aqua fortis* gives a beautiful red Tincture, and in Oil of Vitriol leaves a Tincture of a brown dark Red. The woody Part of theſe Stones in *Aqua fortis* alſo gives a red Tincture, tho' ſomewhat paler; and, when taken out of the Liquor, ſhews red Spots in its Pores, which I take to be Particles of Iron and Sulphur: Theſe Spots, when the Wood began to dry, became black; and the Wood, when dry, turned of the Colour of a deep red *Jeſuit's-Bark.*

In ſome of theſe Stones, ſeveral curious Veins, of a red and bluiſh Colour, are very remarkable, being intermixed with black and white *Striæ.*

Having broken ſome of theſe Stones, I found in the Inſide a kind of white, and ſeveral Cluſters of ſmall white and black angular Cryſtals, which thro' the Microſcope appear tranſparent, and of different Shapes, but moſtly hexagonal. I diſcovered ſuch Cryſtals in ſome of the woody Part of theſe Stones.

One Piece of a white Stone I calcined in a Crucible for 24 Hours, but could neither reduce it to Coal or Lime. The Powder yielded faintly to the Magnet. This Stone was found in the Ground at ſome Diſtance from the Lake.

One Piece of a black Stone, found in the Lake, I likewiſe calcined for 24 Hours, and could not reduce it to Coal or Lime: The Powder yielded briskly to the Magnet.

I calcined one Piece of another Stone, about one Inch thick, for about 4 Hours, in an intenſe Fire,

until

until it grew as red as it could be, when I took it out of the Crucible. I obſerved ſeveral Veins (not diſcernible before) of a ferrugineous Matter, about $\frac{1}{10}$ of an Inch thick, and when reduced to Powder, it applied ſtrongly to the Magnet.

In other Stones I found ſome Veins of Wood, about one and two Inches thick, no way petrified, tho' the Stones were every way ſo outwardly.

Some of that woody Part I alſo burnt in a Crucible; it emitted a bluiſh Flame, as if impregnated with Sulphur, and had the ſtrong Smell of burning Charcoal. When burnt to a Coal, and reduced into Powder, it faintly yielded to the Magnet.

How Wood happens to be found in theſe Petrifications, ſound and untouch'd, is ſomewhat ſurpriſing, and to account for it not very eaſy. It may be attributed to this, that the Texture of the Wood is not every where equal; eſpecially where Knots happen, that Part is much harder and cloſer than any other; and if the petreſcent Particles ſhould be once ſtopped, they will fix there, coagulate, and go no further; by which means that Part of the Wood will remain free from Petrification, while the reſt will be turned into Stone; or the Pores of the Wood may happen in ſome Places, and in the very Heart of it, to be ſo full of a reſinous Matter, that it will keep out the petrific Juices, and hinder their further penetrating into them equally: To this may be attributed the ſtrong Smell of this Wood when burning; and the more ſo, as I ſuſpect that moſt of this petrified Wood was Fir, there being a good deal of that kind found daily in Turf-Pits near the Lake; ſome not above twenty Yards Diſtance from it; and the laſt Piece of Wood and Stone continuous that I have received, appearing by the Grain to be of that kind of Wood.

Laſtly, the petrific Juices may happen to be ſo ſtrongly impregnated with Salts and Metal, or any other mineral Particles, that they will immediately ſwell and fill the minuteſt Pores of the Wood, and, by a ſudden Coalition, hinder their further penetrating into it; which ſeems to appear clearly from ſome Cavities in one of theſe Stones, which I ſuppoſe to have been Worm-Holes, and which were no way filled by the petreſcent Liquor which was ſtopped round it; all the Sides of this Hole being overlaid with ſmall brown Cryſtals, occaſioned by the Evaporation of the aqueous Parts, and their being ſtopped and ſoaked by the neighbouring Stone or Wood.

The woody Part of theſe Stones, as I have obſerved, will burn to a Coal, and emit a Flame: That Part intermediate betwixt the Stone and Wood, and which is but partly petrified, being harder than Wood, and ſofter than Stone, will grow red in the Fire, emit a kind of Flame, or rather Sparks of Fire, but doth not conſume, and is properly what Dr. *Grew** calls incombuſtible Wood. The ſtony Part doth not burn, tho' it grows as red as Coal.

I calcined another of theſe Stones, weighing 1 *oz.* 13 *penywts.* 12¼ *gr.*; after burning 4 Hours it weighed but 1 *oz.* 10 *penywts.* 8¼ *gr.* and loſt 3 *penywts.* 4 *gr.*; which proceeds, I ſuppoſe, from unpetrified Veins of Wood in the Heart of the Stone, which were deſtroyed by the Fire, as in the Crucible it emitted now-and-then a bluiſh Flame, as Brandy doth when burning. This Stone, when taken

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* *Muſ. R. S.* p. 269.

out of the Crucible, and cooled, had the Colour of Iron, when heated in, and cooled from the Forge.

Part of another Stone, which, by viſible Veins of Ore, appears to contain a good deal of Iron, I likewiſe calcined for four Hours; the Powder yielded moſt ſurpriſingly to the Magnet; ſo that it appears, that the Opinion of *Nennius*, *Boetius*, and other ancient Writers, was not abſolutely deſtitute of Foundation.

The white Wood-Stones are generally found in the Ground at 2, 4, 6, and 8 Miles Diſtance from the Lake, and ſometimes very deep in the Earth.

The black ones are always found in the Water, or on the Shores of the Lough; ſometimes at the Mouths of Rivers or Rivulets that empty themſelves into it; but thoſe with Wood continuous have not yet been found above 20 Yards Diſtance from the Water of the Lake; that is, where the Water reaches in the Winter, or at other times.

Some of theſe Stones are outwardly covered with a thin white Subſtance, which hath run thro' the Pores of that Part of the Stone that was expoſed to the Air, and not covered by the Water, Mud, or Clay; and on ſome others it is rather an Incruſtation of that white Subſtance, which I take to be the ſlimy, unctuous, ſaline Parts of the petreſcent Juices that filled the outward Pores of the Stone, or coagulated on it. This white Part ſcraped, and put into a Crucible in a violent Fire, could not be reduced to Lime, tho' it grew red as Coal. This Powder calcined appeared thro' the Microſcope quadrangular, like Grains of Salt; which makes me ſuſpect, that theſe Petrifications contain, beſides metalline, a great deal of ſaline Particles, whoſe Sides being ſtrongly attracted to each other, and cloſely joined, hinders the Fire from expanding the Pores of theſe Stones, and their being reduced to Lime.

This black Stone, when broken, appears thro' the Microſcope very beautiful, and like Cloth of Silver, the Pores and Veſſels of the Wood being filled with white minute Cryſtals.

Of theſe Stones I have ſome with Wood outwardly continuous; others with Wood inwardly; one, the leaſt Part whereof is Stone, the reſt Wood; another *vice verſa*; another intirely Wood, except a thin Coat of Stone on one Side, which appears to be the very Bark; one Stone which at one End diſtinctly ſhews the annual Ringlets of the Wood; one that ſhews the Wood, before it was petrified, had been bent, and partly broken, the Fiſſure being filled with a ſparry Matter, and appears plainly from the preſent Appearance and Poſition of the Fibres of the Stone. Some of theſe Stones ſtrike Fire with a Steel, and others, by a ſtrong Colliſion, emit a Train of Sparks.

Some of theſe Stones ſhew the Grain of Holly, Aſh, and Fir. I have but one Piece of Oak petrified, eaſily diſtinguiſhed by its Grain; it ſhews the very Knots of the Wood where young Twigs were cut; and has a Hole made thro' it before it was petrified.

As for theſe Stones being fit for ſharpening or ſetting of Razors, *&c.* the black ones are rather too hard, and the white ones too ſoft. The Whetſtones or Hones, vulgarly ſo called, which are ſold for *Lough-Neagh* Stones, are none of theſe, but of a ſoft gritty kind, and found near *Drogheda*.

When theſe Stones with Wood continuous are taken out of the Water, Mud, or Clay, the woody Part dries, cracks, and falls away; which is the Reaſon why few can be well preſerved; and beſides, every body, unwilling to truſt their Eyes, will touch and ſcrape the Wood, and, by theſe means, deſtroy the moſt curious Part of the Stone.

The curious Gentleman above-mention'd, who hath already begun, and intends, at his Leiſure, to take an accurate Survey of the Lake, will, I hope, be able to give a more juſt and ſatisfactory Account of its petrifying Virtue than I poſſibly can; my Deſign in the preſent Attempt being only to pave the Way, and induce others to make further Experiments in ſearch of Truth, and for improving natural Knowlege. My Habilities do not anſwer my Good-will; therefore I hope Defects in the Performance and Language of a Foreigner, will be excuſed. I ſhould be very proud, that theſe few Remarks could deſerve your Approbation, and of your Friends; and ſhall be glad to hear of its Succeſs.

S I R,

Dublin, June 10.
1746.

Your moſt humble,
and obedient Servant,

James Simon.

P.

P. S. I had lent the above Papers to the Biſhop of *Cloyne*, from whom I received them Yeſterday, with the original Letter to *Thomas Prior*, Eſq; of which follows the Copy.

A Letter from the Right Rev. Dr. George Berkeley, *Lord Biſhop of* Cloyne, *to* Tho. Prior, *Eſq*; *in* Dublin.

Cloyne, May 20. 1746.

Dear Sir,

I HERE ſend you back the curious Diſſertation of Mr. *Simon*, which I have peruſed with Pleaſure; and tho' Variety of Avocations gives me little Time for Remarks on a Subject ſo much out my Way, I ſhall nevertheleſs venture to give my Thoughts briefly upon it, eſpecially ſince the Author hath been pleaſed to invite me to it by a Letter.

The Author ſeems to put it out of Doubt, that there is a petrifying Quality both in the Lake and adjacent Earth. What he remarks on the unfrozen Spots in the Lake is curious, and furniſheth a ſufficient Anſwer to thoſe, who would deny any petrifying Virtue to be in the Water, from Experiments not ſucceeding in ſome Parts of it; ſince nothing but Chance could have directed to the proper Places, which, probably, were thoſe unfrozen Parts.

Stones have been thought by ſome to be organiſed Vegetables, and to be produced from Seed. To me it ſeems, that Stones are Vegetables unorganiſed. Other Vegetables are nouriſhed and grow by a Solution of Salt attracted into their Tubes or Veſſels. And Stones grow by the Accretion of Salts, which often ſhoot into angular and regular Figures. This appears in the Formation of Cryſtals on the *Alps*: And that Stones are formed by the ſimple Attraction and Accretion of Salts, appears in the Tartar on the Inſide of a Claret-Veſſel, and eſpecially in the Formation of a Stone in the human Body.

The Air is in many Places impregnated with ſuch Salts. I have ſeen at *Agrigentum* in *Sicily* the Pillars of Stone in an ancient Temple corroded and conſumed by the Air, while the Shells which entered the Compoſition of the Stone remained intire and untouched.

I have elſewhere obſerved Marble to be conſumed in the ſame manner; and it is common to ſee ſofter Kinds of Stone moulder and diſſolve merely by the Air acting as a *Menſtruum*. Therefore the Air may be preſumed to contain many ſuch Salts, or ſtony Particles.

Air, acting as a *Menſtruum* in the Cavities of the Earth, may become ſaturated (in like manner as above-ground) with ſuch Salts, as, aſcending in Vapours or Exhalations, may petrify Wood, whether lying in the Ground adjacent, or in the Bottom of the Lake. This is confirmed by the Author's own Remark on the Bath called the *Green Pillars* in *Hungary*. The inſinuating of ſuch Salts into the Wood ſeems alſo confirmed by the Author's having obſerved minute hexagonal Cryſtals in the woody Part of the Petrifactions of *Lough-Neagh*.

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A petrifying Quality or Virtue ſhews itſelf in all Parts of this terraqueous Globe, in Water, Earth, and Sand; in *Tartary* for inſtance, and *Afric*, in the Bodies of moſt Sorts of Animals, it is even known that a Child hath been petrified in the Mother's Womb. *Oſteocolla* grows in the Land, and Coral in the Sea. Grottoes, Springs, Lakes, and Rivers, are in many Parts remarkable for this ſame Quality. No Man therefore can queſtion the Poſſibility of ſuch a thing as petrified Wood; tho' perhaps the petrifying Quality might not be originally in the Earth or Water, but in the Vapour or Steam impregnated with ſaline or ſtony Particles.

Perhaps the Petrification of Wood may receive ſome Light from conſidering Amber, which is dug up in the King of *Pruſſia*'s Dominions.

I have written theſe haſty Lines in no ſmall Hurry; and ſend them to you, not from an Opinion, that they contain any thing worth imparting, but merely in Compliance with your and Mr. *Simon*'s Requeſt.

[*Added from a Letter to Dr.* J. Fothergill, *dated* Dublin, Aug. 8. 1746.]

And yet, before I have done, I muſt needs add another Remark, which may be uſeful for the better underſtanding of the Nature of Stone. In the vulgar Definition, it is ſaid to be a Foſſil incapable of Fuſion. I have nevertheleſs known Stone to be melted, and when cold to become Stone again. Such is that Stuff, by the Natives called *Sciara*, which runs down in liquid burning Torrents from the *Craters* of Mount *Ætna*, and which, when cold and hard, I have ſeen hewed and employed at *Catania*, and other Places adjacent. It probably contains mineral and metallic Particles; being a ponderous, hard, grey Stone, uſed for the moſt part in the Baſements and Coinage of Buildings.

Hence it ſhould ſeem not impoſſible for Stone to be caſt or run into the Shape of Columns*, Vaſes, Statues, or *Relievo's*; which Experiment may perhapes, ſome time or other, be attempted by the Curious; who, following where Nature has ſhewn the Way, may (poſſibly by the Aid of certain Salts and Minerals) arrive at a Method for melting and running Stone, both to their own Profit, and that of the Public. I am,

Dear Sir,

Your moſt humble Servant,

G. Cloyne.

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* To confirm what the Biſhop ſays, I remember when I was in the College in *France*, that I went to ſee a Relation of mine, a Frier, at *Fontevrand*, where he ſhew'd me in their Church two Pillars of Stone, about 60 Feet high, all of one ſolid Piece, which he ſaid had been run. *J. S.*